

(19) World Intellectual Property Organization  
International Bureau(43) International Publication Date  
11 December 2003 (11.12.2003)

PCT

(10) International Publication Number  
WO 03/101845 A2(51) International Patent Classification<sup>7</sup>: B65D 8/22

(21) International Application Number: PCT/CA03/00809

(22) International Filing Date: 30 May 2003 (30.05.2003)

(25) Filing Language: English

(26) Publication Language: English

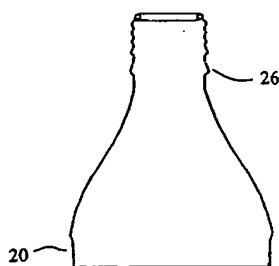
(30) Priority Data:  
60/385,386 3 June 2002 (03.06.2002) US(71) Applicant (for all designated States except US): ALCAN  
INTERNATIONAL LIMITED [CA/CA]; 1188 Sher-  
brooke Street West, Montreal, Québec H3A 3G2 (CA).

(72) Inventors; and

(75) Inventors/Applicants (for US only): GILLEST, Ed-  
mund [US/US]; 80 Wiley Lane, Batavia, IL 60510 (US).WILSON, Lloyd [US/US]; 3107 Anton Drive, Aurora,  
IL 60504 (US). GEHO, Jeffrey, Edward [US/US]; 3023  
Fairfield Lane, Aurora, IL 60504 (US).(74) Agents: GALE, Edwin, J. et al.; KIRBY EADES GALE  
BAKER, P.O. Box 3432, Station D, Ottawa, Ontario K1P  
6N9 (CA).(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD,  
SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US,  
UZ, VC, VN, YU, ZA, ZM, ZW.(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,

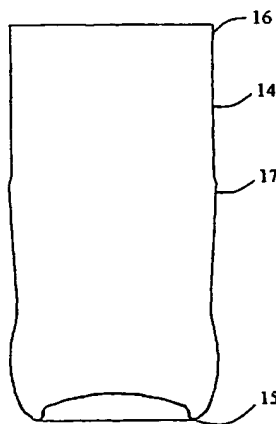
[Continued on next page]

(54) Title: TWO PIECE CONTAINER



A

(57) Abstract: A two piece container having a hidden peripheral seam is described. The seam between the upper portion and the lower portion of the container is formed of mating flanges on the upper and lower portions of the container and it is effectively hidden from view by placing the seam at the base of the neck in containers having a relatively long slender neck above a relatively larger diameter main body portion or by placing the seam immediately below a relatively larger diameter shoulder near the base of the upper section of the container so that the seam is visually obscured by the shoulder section. Other complimentary decoration and finishing techniques for reducing the visibility of the seam on such a container are also described.



B

WO 03/101845 A2

BEST AVAILABLE COPY



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *without international search report and to be republished  
upon receipt of that report*

TITLE: TWO PIECE CONTAINER

TECHNICAL FIELD

This invention relates to containers and more particularly to decoratively shaped containers predominantly used for holding beverages.

5 BACKGROUND ART

The bottle shaped container has been a preferred configuration for many years due to its ornamental appeal and the ease with which fluids may be consumed or dispensed. One piece metal bottle containers have been disclosed as well as two piece and three piece containers. However, due to the wide scale adoption of the drawn and  
10 iron container body technology, two piece metal containers have become the most common. The most common of these containers, the 12 ounce beverage can, uses a drawn and ironed can body seamed with a mechanical seam to a flat panel top usually having a stay on tab opening system.

While bottle shaped containers found wide consumer appeal when made from  
15 other materials such as plastic or glass, metal containers in a bottle shape have not found wide acceptance. Some beverages are now packaged in impact extruded one piece containers, but these tend to require a thick side wall and are therefore quite expensive. Also, some beverages are packaged in an aluminum bottle produced by Daiwa Can of Japan. While this container can be attractively decorated, it does not  
20 provide a variety of shapes and the seam between the upper portion of the bottle and the bottom is quite visible to the naked eye limiting its aesthetic appeal to the consumer. Other two-piece metal bottle shaped containers for use with beverages and other products have also been produced, however, they also have readily visible seams.

A two piece bottle shaped metal container having the seam between the two  
25 pieces that is hard to detect is desired for aesthetics and enhanced consumer appeal, easy manufacturing and reduced manufacturing costs. This container could utilize either snap-on, crimped, threaded, or lug closures and different types of seals within these elements.

## DISCLOSURE OF THE INVENTION

The present invention provides a bottle or other decoratively shaped metal container including a removable closure. The container is formed from an upper portion and a lower portion that are joined together at a seam that is largely hidden from view. The top portion includes a spout and connecting elements that allows the closure to be attached to the top portion that in conjunction with the removable closure closes the container. In one embodiment adhesive material, placed on one or both mating peripheral flanges of the upper and lower container portions extrudes between the peripheral flanges. In addition to bonding the upper portion to the lower portion, the adhesive coats the surfaces at the peripheral flange sealing or blocking the bare metal at the extremities. In another embodiment, the adhesive when applied is applied to the bare metal at the extremities as well as the peripheral flanges. In either case the upper and lower portions are preferably coated with a lacquer, or another type of coating, prior to the application of the adhesive because the current art of forming these pieces preferably requires them to be coated to avoid metal pick up on the tooling and exposure of the bare edge to the contents of the container. However, there is bare metal at the extremities that does not necessarily get coated or is exposed because it is made from coated sheet stock. In yet another embodiment, the adhesive may be applied to the bare metal. This adhesive sealing process provides the benefit of allowing easy manufacture of a bottle shaped container from metal. The adhesive sealing process of the present invention may eliminate the need for subsequent applications of coating material to the seam either as an overcoat or as a spot repair where the two portions of the container mate.

The container includes one or more seals between the top portion and the closure. In one embodiment, a seal member is within the closure and forms a seal between a downwardly projecting rim of the closure and a ledge formed in an upper part of the spout.

In another embodiment of the invention a second seal member is used in addition to or in place of the first seal member. The second seal member is placed against a top panel of the closure and contacts a top surface of a curled seal rim of the spout. This type of seal member advantageously may be used to form a seal with

minimal use of downward force. This is especially useful when the container includes thin sidewalls that do not possess superior axial strength.

In yet another embodiment of the invention, the second seal member is made from a heat softened material which forms a superior seal with the application of heat, thus, reducing the need for excessive axial force. As stated above, reduced axial force requirements are beneficial in a container utilizing thin sidewalls.

The hidden seam of the present invention is achieved by one or more of the location of the seam and the design of the surrounding elements of the overall bottle design. The hidden seam can be obtained with either the mating flange of the upper portion of the bottle overlying the mating flange of the lower portion or with the lower portion overlying the upper portion. In one embodiment, the bottle is configured to have a relatively long slender neck with the seam between the upper and lower portions of the bottle located at or near the base of the long slender neck. In this embodiment, the lower portion of the bottle is necked in a substantial amount and a mating flange along the upper periphery of the lower portion of the bottle is joined to a corresponding mating section located around the lower periphery of the upper portion of the bottle. In this configuration the mating flange around the base of the long slender neck overlies the mating flange around the top of the base and because of its location is not readily apparent to the casual observer. In a preferred variation of this embodiment, the lower portion is provided with a step immediately below the mating flange. The step is about the same width as the thickness of the mating flange along the lower periphery of the upper portion.

In another embodiment of the present invention a cone shaped upper portion is attached to a lower body portion along a mating flange that is recessed below a shoulder section of the cone shaped upper portion and then fits inside an overlying mating flange on the bottom portion. Because the cone shaped top is formed to have shoulder section immediately above the mating flange, when it is assembled with the lower portion of the bottle, the shoulder section tends to hide the edge of the overlying flange that would otherwise be plainly visible at the seam. The shoulder section projects outwardly more than the thickness of the metal in the mating flange around the upper peripheral edge of the lower portion of the container. Advantageously, the shoulder projects outwardly a

distance that is at least twice the thickness of said flange and preferably a distance that is three times or more the thickness of said flange.

In a further embodiment of the present invention, the above-described seams between the upper portion and the lower portion of the metal bottle can be further hidden from view by certain decoration techniques. In particular, the seam and adjacent areas of the bottle can be covered with ink, lacquer, other coatings and/or shrink or stretch wrap plastic labels, plastic roll labels and/or paper labels all of which can have geometric or other graphics that tend make it harder for the casual observer to see the seam. For the present purposes, the term adjacent may include immediately adjacent surfaces or it may also include surfaces extended substantially beyond the immediate area of the seam out to and including the surface of the entire bottle. In addition, because the upper and lower portions of the metal containers of the present invention may be manufactured using different techniques, the as-formed surface finish of the upper and lower portions of the present two piece bottles can be substantially different. In this situation, it may be desirable to cover the seam area or the upper or lower portion of the bottle adjacent to the seam with decorative inks, lacquers, other coatings, labels, shrink or stretch wrap labels, plastic roll labels, and/or paper labels. In addition, or separately it may be desirable to treat the bottle in its entirety, or the upper or lower portions individually, or pretreat the sheet from which either or both of the upper and lower portions thereof was made to reduce the attention that would otherwise be drawn by the seam or the differing surface finishes that may exist on either side of the seam. Yet another approach would be to colorize with decoration, coating, lacquer, paint or ink the upper, lower or both portions at a stage in their manufacturing process or the pre-color sheet stock in such a way that the hue, intensity and/or other color attributes vary to compensate for changes in these color attributes that occur during subsequent forming operations so that no color gradient or differences in surface finish is readily apparent to the casual observer. Two other approaches would be to make the different appearance to the two portions part of the final design, or use the color gradient that could result from manufacturing as part of the design.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a cross sectional view of a two piece metal container made in accordance with the present invention;

Figure 1A shows a cross sectional view of the upper portion of the two piece  
5 metal container shown in Figure 1;

Figure 1B shows a cross sectional view of the lower portion of the two piece metal container shown in Figure 1;

Figure 1C shows an enlarged cross sectional view of the seam between the upper and lower portions of the two piece metal container shown in Figure 1;

10 Figure 2 shows a cross sectional view of an alternate two piece metal container made in accordance with the present invention;

Figure 2A shows a cross sectional view of the upper portion of the two piece metal container shown in Figure 2;

Figure 2B shows a cross sectional view of the lower portion of the two piece  
15 metal container shown in Figure 2; and

Figure 2C shows an enlarged cross sectional view of the seam between the upper and lower portions of the two piece metal container shown in Figure 2.

## BEST MODES FOR CARRYING OUT THE INVENTION

### Two piece container

20 Figures 1 and 2 show two alternate embodiments of a two piece container made in accordance with the present invention.

The upper portion and lower portion of a two piece container shown in Figure 1 or Figure 2 may be formed from identical materials or different materials. The lower portion may be formed from aluminum, plastic or steel. Preferably, the lower portion is  
25 formed by drawing and ironing 3XXX H19 alloy such as 3104 H19 alloy aluminum.

The upper portion may be formed from the same or a different metal or from plastics, but is preferably formed of aluminum by a draw redraw type process. A benefit to aluminum or steel construction is that the cold temperature of a liquid inside the container may be felt by the user and that the shelf life of the product may be extended.

5 Thus, the user may feel more refreshed as he or she is consuming a cold beverage.

The container may hold anywhere from about 148 milliliters (5 ounces) to about 1.18 liters (40 ounces) of product. In one typical application, the container of the present invention is a beverage container used advantageously for beer or a carbonated beverage; however other liquid or pourable solid products can be packaged in the  
10 present containers.

#### Lower portion

The lower portion 14 or body portion of the containers shown in Figures 1 and 2 has an open top and closed bottom and includes a base 15 and a top peripheral  
15 flange 16. The base 15 may have a generally circular profile. Other profiles for the base 15 are possible including asymmetrical and symmetrical non-circular profiles. The base 15 at its center may be deformed inwardly towards the interior of the container. This indentation increases the strength of the base 15 of the body portion 14. The body portion includes sides 17. The sides 17 of the body portion 14 may be contoured to  
20 create varying bottle shapes. The body portion 14 includes a peripheral flange 16 at its top that may be vertical but is preferably slightly angled from vertical as shown in Figures 1C and 2C. If top peripheral flange 16 forms the outside surface of the seam as shown in Figure 1, then it is preferably angled outwardly. Any angle  $\theta$  can be used, an angle of less than 45 degrees is advantageous; however an angle of less than 5 degrees  
25 is preferred and an angle of 1 – 3 degrees is most preferred. If top peripheral flange 16 forms the inside surface of the seam as shown in Figure 2, then it is preferably angled slightly inwardly. An angle of less than 10 degrees can be used; however, an angle of less than 5 degrees is preferred and an angle of 1 – 3 degrees is most preferred. An angle of 2 degrees is illustrated in Figures 1C and 2C.



In the embodiments shown in Figure 2, the lower portion 14 also includes a transition section 18 immediately below the top peripheral flange and a main body section below the transition section. In the long neck container shown in Figure 2, a relatively smaller diameter top peripheral flange 16 is joined to a relatively larger diameter side wall 17 of the main body section of the container by a transition section 18 which curves inwardly from the side wall 17 to the flange 16. In this manner, the seam shown in more detail in Figure 2C is located at the base of the neck of the container above the transition section 18 of the lower portion 14.

#### Upper portion

10 The upper portion 11 or neck portion of the container includes a spout 12 at its top and a generally vertical or sloped section 19 below the spout. The generally vertical section 19 is shown in Figure 2 and the sloped section 19 is shown in Figure 1. The generally vertical section or sloped section 19 includes a preferably circular peripheral flange 20 at its base. The spout supports a closure that keeps the product inside of the container when it is in place. The closure (not illustrated) can be a rotate on/off type; a crimp-on, pry-off type; a crimp-on, rotate-off type; a snap-on, snap-off type or a bonded peelable closure. As shown in Figures 1C and 2C, the upper portion 11 and lower portion 14 are joined at a hidden overlapping seam 21 between the peripheral flange 20 of the upper portion and the peripheral flange 16 of the lower portion. As used in this application, the term hidden seam refers to a seam that is designed in such a way that it is less noticeable when viewed from common viewing angles. This hidden characteristic can arise from the seam being obscured from view or from the seam being located at certain points relative to the overall bottle design such that the viewer's eye is not attracted to the seam. Such seams may be visible from certain viewing angles but in the context of the overall shape of the container, the seams of the present container are less apparent to a casual observer.

In one embodiment of the invention, the peripheral flange 20 of the upper portion 11 overlaps an exterior surface of the peripheral flange 16 of the lower portion as shown in Figure 2C. In another embodiment of the invention, the positions are reversed; i.e. the peripheral flange 16 of the lower portion 14 overlaps an exterior surface of the peripheral flange 20 of the upper portion 11 as shown in Figure 1C. In

the embodiment shown in Figure 2, the diameter of the peripheral flanges 16 and 20 are substantially smaller than the outside diameter of the main body section of the container. The diameter of peripheral flanges 16 and 20 in this embodiment may range from about 2.5 centimeters (1 inch) to about 5 centimeters (2 inches), but are preferably less than 3.8 centimeters (1.5 inches) in diameter and are shown at about 3.5 centimeters (1.4 inches) in diameter in the example shown in Figure 2. In an alternate embodiment shown in Figure 1, the diameter of the peripheral flanges 16 and 20 are substantially smaller than the outside diameter of the transition section 27 of the container.

- 10 The spout 12 at the top of the upper portion 11 has a generally cylindrical central part 24 and includes a pouring opening 13. The generally cylindrical central part 24 may include threads as illustrated in Figure 1 or be smooth as illustrated in Figure 2. The upper part may include a curled seal rim 23 that surrounds the pouring opening and may include a small ledge 25 about the curled seal rim as shown in
- 15 Figure 1. In certain embodiments, the container may have a neck ring 26 that protrudes either out of the container as shown in Figure 1A or 2A or into the container (not shown), or a combination of both (not shown) that is used to transport the container in a plant and/or be used as a load bearing point during the closing operation. In some instances this neck ring 26 may be required to keep the container from collapsing
- 20 because of axial loads that the whole container would otherwise be subjected to during closing. Closing refers to the operation of applying the closure to the container. Also, because the container would most likely be top heavy and/or easily tipped over, the neck ring may provide an alternate way to transport the container in a plant.

#### Closure

- 25 The closure (not illustrated) has attaching elements that allows it to be attached to the complimentary attachment elements on the spout. Many different closures are illustrated in the art. Closures generally include a top panel and a rim shaped to extend downward from the top panel around the spout. The rim includes a generally circular lower edge.

The closure may be held onto the spout by means known in the art such as screw threads. Metal or plastic threaded closures suitable for use on metal containers are described in US patent 6,010,026 the disclosure of which is incorporated herein by reference.

5        Alternatively, the closure may be crimped around the sealing rim of the spout. Closures of this type, often referred to as crowns, are well known in the art. Some crowns are designed to be removed by rotating the crown, some must be removed by prying up on one side and some are scored so that they can be easily pulled apart. All of these types are well known to persons skilled in the art of metal containers.

10

#### Seam

The joint between the body portion 14 and the neck portion 11 of the container is formed by overlapping the peripheral flanges 16 and 20 of the respective portions. Adhesive material may be applied to one or both contacting flange surfaces. If the  
15 peripheral flange 16 of the body portion 14 overlaps the peripheral flange 20 of the neck portion 11, adhesive is applied to either or both the interior surface of the body portion peripheral flange 16 and the exterior surface of the neck portion peripheral flange 20. If the peripheral flange 20 of the neck portion 11 overlaps the peripheral flange 16 of the body portion 14, then adhesive is applied to either or both the exterior  
20 surface of the body portion peripheral flange 16 and the interior surface of the neck portion peripheral flange 20.

As the body portion 14 and neck portion 11 are moved from a point of first contact to a final position with their respective peripheral flanges 16 and 20 overlapping, the adhesive is extruded between the peripheral flanges 16 and 20. Excess  
25 adhesive is pushed from the joint between the peripheral flanges 16 and 20 to coat any exposed metal that does not have a coating which may be the case at the extremities of each peripheral flange 16 and 20.

Alternatively, the joint between the neck portion 11 and the body portion 14 may be welded. Laser welding of a sheet metal seam in a container is described in US patent 6,060,681 the disclosure of which is incorporated herein by reference.

#### Forming processes

5 In the forming process for the body portion of the container, steel or aluminum, provided in sheet or coil form is lubricated and cut into pieces for subsequent operations. An individual piece, or blank, is then cupped to provide the initial shape of the container. Cupping and subsequent formation of the base and sidewalls of the body portion may be formed by a deep drawing process that is well known in the art of  
10 producing aluminum beverage cans. A variation on the known deep drawing process can also be utilized which avoids the formation of a transverse flange at the top of the body portion. The process variation uses induction, spinning mandrels, or water pressure to force the base and sidewalls into a die representing the desired shape of the container. Subsequent forming processes include ironing, which is well known in the  
15 art, to extend the length of the sidewalls of the body portion.

The upper edge of the formed body portion is then trimmed to a uniform height. Ears created by the ironing process and any other excess material is removed in a trimming step. The formed body portion is washed and dried and finishing procedures are performed which may include: decorating, varnishing, coating, sizing, inspection,  
20 and shaping. The body portion is then ready for adhesive connection to the top portion of the container.

The upper portion is formed separate from the lower portion. The first step in forming the upper portion from sheet metal is to blank or cut a round disc from a metal sheet and to draw a low cylindrical boss in the center of the disc. An annular flange  
25 circumscribes the boss. This blanking and drawing is preferably performed in one single operation but may comprise two operations. Application of this invention to the manufacture of steel tops and cans may require different tooling due to the different properties of steel, e.g., strength and formability, as compared to aluminum.

The next steps are to redraw the boss to increase its height and reduce its diameter. It may be necessary to redraw the boss two or more times to form progressively higher bosses with progressively smaller diameters without tearing or wrinkling the metal. The optimum number of redraws will depend on several factors including the gauge, temper, and formability of the metal, coatings on the metal, and the diameter of the spout. The outer diameter of the flange is preferably not affected by the redraw operations. It is desirable to maximize the reduction taken in each redraw in order to minimize the number of redraw operations. Conversely, the percent reduction must not be so great as to cause tearing or wrinkling of the metal during such redraw.

10 A center portion of the end wall of the boss is then removed by a blanking or piercing operation in a manner well known in the art and the cut edge around the opening has been wiped upwardly to extend the length of the boss and leave an upwardly projecting flange around the opening in the boss to be formed into an outwardly curled or folded bead. Alternatively, the cut edge of the boss can be wiped  
15 down for subsequent forming into an inwardly curled or folded bead.

The upper portion and/or lower portion could also be formed of molded plastic by processes well known in the art

FIG. 2A shows upper portion 11 after it has been trimmed around its lower peripheral edge and reformed into a pouring spout 12 with long neck portion 19 and an  
20 outwardly extending curvilinear flange 26 around the lower peripheral edge of the spout 12. The flange 26 is designed to facilitate handling and attachment of a closure to the open end of the spout. FIG. 2A further shows a curled bead 23 around the top edge of the spout 12 on the upper portion 11. The bead 23 is shown curled outwardly but can also be curled inwardly for some applications. An outward curl should minimize the  
25 possibility that the terminal or cut edge of metal in the bead might be contacted by the contents of a container on which a spout is secured. The outward curl will also minimize the possibility that beverage in the container might be trapped in the bead. An inwardly-curved bead may offer advantages such as formability, aesthetics or the like.

Figure 2B shows the lower portion 14 of the container. The lower portion 14  
30 of the container 40 may be made entirely of one piece of thin metal such as 3004, 3104

or 3204 H-19 aluminum alloy. The lower portion 14 before being necked is typically a drawn and ironed (D&I) can body except that it may have a top "thick wall" portion adapted to be necked into the transition section 18 of the lower portion. The thick wall portion is not ironed as much as, and is therefore thicker than, the lower portion of the sidewall. The thick wall portion is more formable into a transition section 18 in that the thicker metal can be formed with less wrinkling or other undesirable deformation. The thick wall extends to the top of the lower portion 14 which is the length of the transition section 18 and the adjacent mating flange (necked in portion) 16 for subsequent joining to the upper portion 11 of the container. A typical drawn and ironed (D&I) lower portion 14 may have metal of about (0.0166 inch) in the bottom profile 15, a thickness of about 0.147 millimeters (0.0058 inch) in the main body section, and a thickness about 0.203 millimeters (0.0080 inch) in the transition section 18. Such lower portion 14 may have a diameter of about 6.033 centimeters (2.375 inches) and a height of about 16.51 centimeters (6.5 inches) to hold 354 milliliters (12 fluid ounces) or a diameter of about 6.71 centimeters (2.64 inches) and a height of about 15.24 centimeters (6.0 inches) to hold 590 milliliters (20 fluid ounces). Other D&I can bodies for use with this invention may have metal thickness of about 0.203 to 0.508 millimeters (0.008 to 0.020 inch) in the bottom profile 15, a thickness of about 0.114 to 0.165 millimeters (0.0045 to 0.0065 inch) in the thin wall portion 17 and a thickness of about (0.0045 to 0.0085 inch) in the transition section 18. Such can bodies may have diameters of about (2.0 inches to 3.5 inches) and heights of about (3.5 inches to 10 inches) and be made of 5XXX series or 3XXX series aluminum alloy.

In accordance with this invention, drawn or ironed lower portion 14 may be necked inwardly to form a transition section 18 by a die necking method similar to that illustrated and described in U.S. Pat. No. 5,355,710, issued Oct. 18, 1994, or a spin necking method similar to that illustrated and described in U.S. patent 4,760,725, the disclosures of which is incorporated by reference into this application. To form a lower portion of a container having a profile similar to that shown in Fig. 2B requires at least 10, and preferably 20 to 30 or more necking operations in order to form a transition section 18 on an aluminum can body having a diameter of approximately 3 inches down to a mating flange which is adapted to be joined to a upper portion similar to long neck upper portion shown in Figure 2A. To form a transition section on a 3 inch

diameter lower portion to join to top sections of larger diameters would require fewer necking operations than are required for the long neck upper portion illustrated in Fig 2A. The lower portion illustrated in Figure 1B does not require any necking operations.

5        FIG. 1 is a cross-section through the container 10 without details necessary for attaching a closure to the top thereof. As seen in FIG. 1, the top portion 11 includes a cylindrical spout 12 in which threads may be formed and a rim 13 around the top periphery of the spout that may be curled to form a bead.

#### Decoration

10        In the present invention, decorative elements can be functional as well as merely decorative. Certain decorative elements can help produce the hidden seam effect of the present invention.

In one embodiment a plastic or paper label is applied over all or part of the present container. Films for making labels and shrink wrap sleeves and related design  
15 services are available from Lawson Mardon Corporation. If only part of the container is covered the surface on one side or the other of the seam should be covered for a substantial distance, or the surface on both sides of the seam should be covered for a substantial distance. This tends to hide the seam in the decorative elements or draw the observer's attention away from the seam and thus make it less apparent. This is  
20 particularly applicable where the upper portion of the container is formed by a different process than the lower portion. For example, if the upper portion is formed by the draw redraw process describe above and the bottom portion is formed by the D&I process described above, the lower portion will have a substantially brighter as formed surface finish than the upper portion. This difference in surface finish will naturally draw  
25 attention to the presence of the seam. However, if the container surface is covered as described above, then the separation that is visually created between the brighter and duller surface finishes reduces the impact of the difference on the casual observer.

In another embodiment, the upper portion of the container is formed from bright sheet metal and the bottom portion is formed form sheet metal having a conventional

surface finish. When the above-described forming processes are used, the bright sheet retains some of its brightness and thus the as formed surface finish is more similar to the D&I surface finish on the lower portion of the container. Bright sheet aluminum useful in the present invention is commercially available or can be produced by  
5 chemically brightening the surface of aluminum sheet by dipping or spraying the sheet with nitric acid according to known brightening methods.

Although the invention has been shown and described with reference to certain preferred and alternate embodiments, the invention is not limited to these specific embodiments. Minor variations and insubstantial differences in the various  
10 combinations of materials and methods of application may occur to those of ordinary skill in the art while remaining within the scope of the invention as claimed and equivalents. Use of the term "or" herein is the inclusive, and not the exclusive use. Moreover, although various features may be claimed in certain specific combinations in the following claims, the invention includes any and all possible combinations of those  
15 features.



### Claims

1. A two piece container having a hidden peripheral seam between an upper portion and a lower portion and a long neck profile, characterized in that said container comprises a drawn and ironed lower portion having a main body section with a first diameter, a transition section between said main body section, and a relatively short necked-in section having a second diameter substantially smaller than said first diameter, said necked-in section being adapted to attach to the lower peripheral edge of a separate relatively long neck upper portion having a top edge adapted to seal with a closure for retaining a product within said container.
2. A container according to claim 1 characterized in that the long neck upper portion is formed by cutting a circular blank, drawing the blank one or more times to form a boss of the desired height, removing a portion of the end wall of the boss and curling the remaining portion of the end wall.
3. A container according to claim 1 or claim 2 characterized in that said first diameter of said main body section is between 5 centimeters (2 inches) and 8.9 centimeters (3.5 inches) and said second diameter of said necked-in section is between 2.5 centimeters (1 inch) and 5 centimeters (2 inches).
4. A container according to any preceding claim characterized in that said necked-in section is formed by die necking, spin necking or a combination thereof.
5. The metal container of claim 4 characterized in that said die necking is performed in 1 to 50 stages.
6. A container according to any preceding claim characterized in that the long neck upper portion and the lower portion are made from aluminum.
7. A container according to any preceding claim characterized in that the long neck upper portion is adhesive bonded to the lower portion.
8. A container according to any one of claims 1 to 6 characterized in that the long neck upper portion is welded to the lower portion.

9. A container according to any preceding claim characterized in that the lower peripheral edge of the long neck upper portion surrounds the short necked-in section of the lower portion.
10. A container according to any preceding claim adapted for use as a beverage container for a carbonated beverage.
11. A container according to any preceding claim characterized in that the container is decorated to cover a substantial portion of the long neck upper portion, the main body section or the transition section.
12. A container according to any one of claims 1 to 10 characterized in that the container is decorated to cover a substantial portion of the long neck upper portion.
13. A container according to any one of claims 1 to 10 characterized in that the container is decorated to cover a substantial portion of the long neck upper portion and the transition section.
14. A container according to any one of claims 1 to 10 characterized in that container is decorated to cover a substantial portion of the main body section.
15. A container according to any one of claims 1 to 10 characterized in that container is decorated to cover a substantial portion of the transition section.
16. A container according to any one of claims 11 to 15 characterized in that the decoration comprises a shrink wrap sleeve.
17. A container according to any one of claims 11 to 15 characterized in that the decoration comprises a lacquer coating.
18. A two piece container having a hidden peripheral seam between an upper portion and a lower portion which seam is formed of mating flanges on the upper and lower portions of the container, one of said flanges being attached to a transition section between said flange and the remainder of said upper portion or lower portion which transition section is selected from the group consisting of a transition from a substantially smaller diameter inner mating flange to a substantially larger diameter

bottom portion and a larger diameter shoulder section between a smaller diameter inner mating flange and a conical top portion.

19. A container according to claim 18 characterized in that the transition section is a larger diameter shoulder section between a smaller diameter inner mating flange and a conical top portion.

20. A container according to claim 19 characterized in that the diameter of the shoulder section is larger than the diameter of the mating flange on the lower portion plus twice the thickness of said mating flange.

21. A two piece container having a hidden peripheral seam between an upper portion and a lower portion which seam is formed of mating flanges on the upper and lower portions of the container, characterized in that space between the mating flanges is filled and sealed with a seal member.

1/4

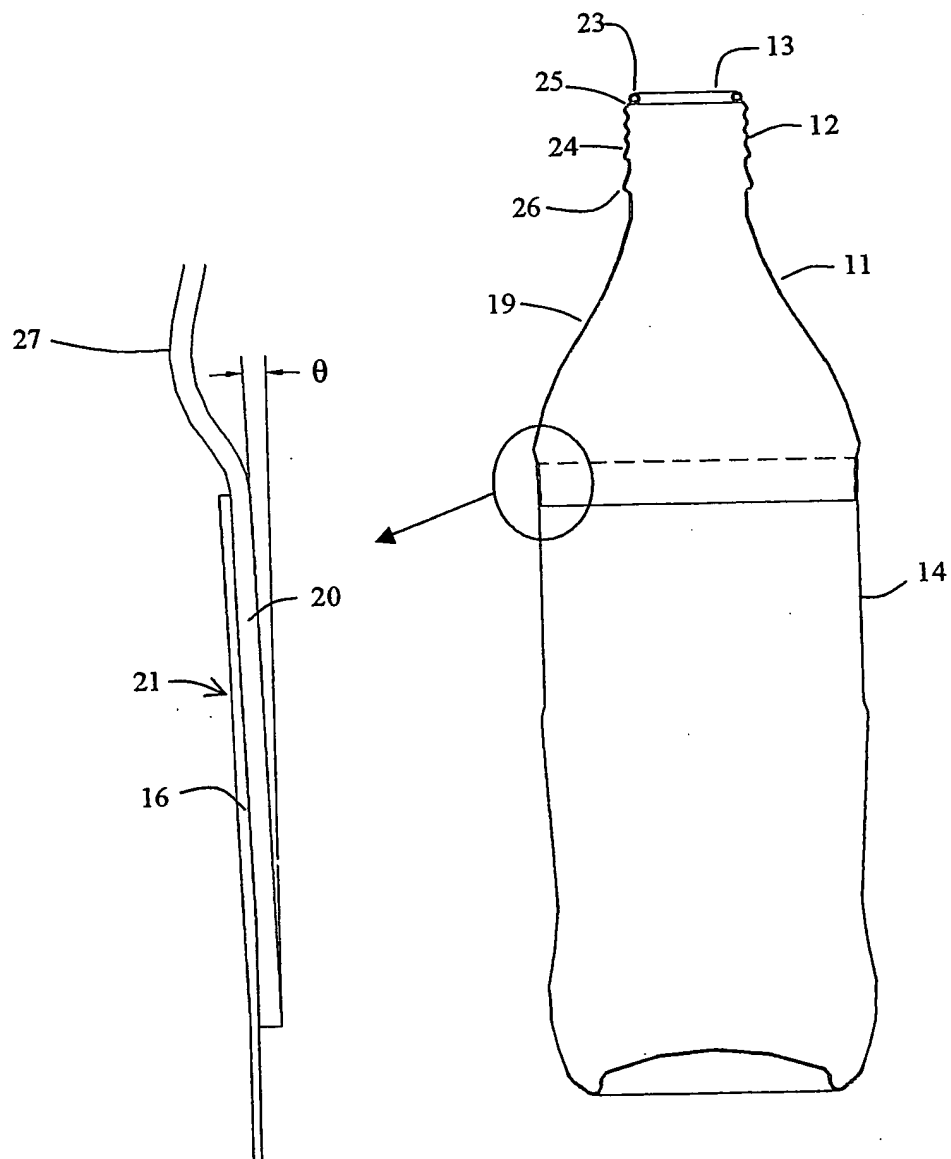


Fig. 1C

Fig. 1

2/4

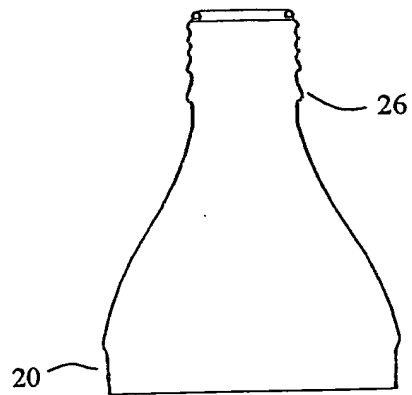


Fig. 1A

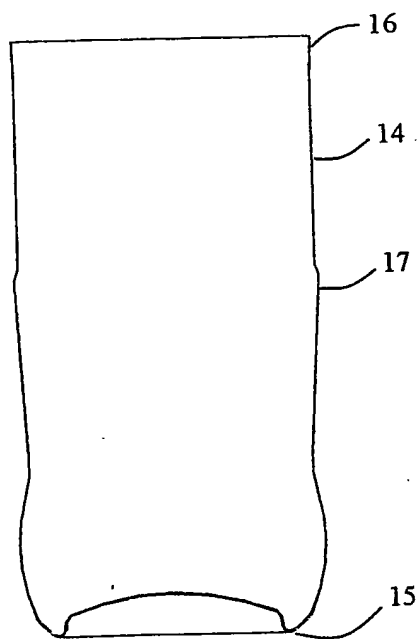
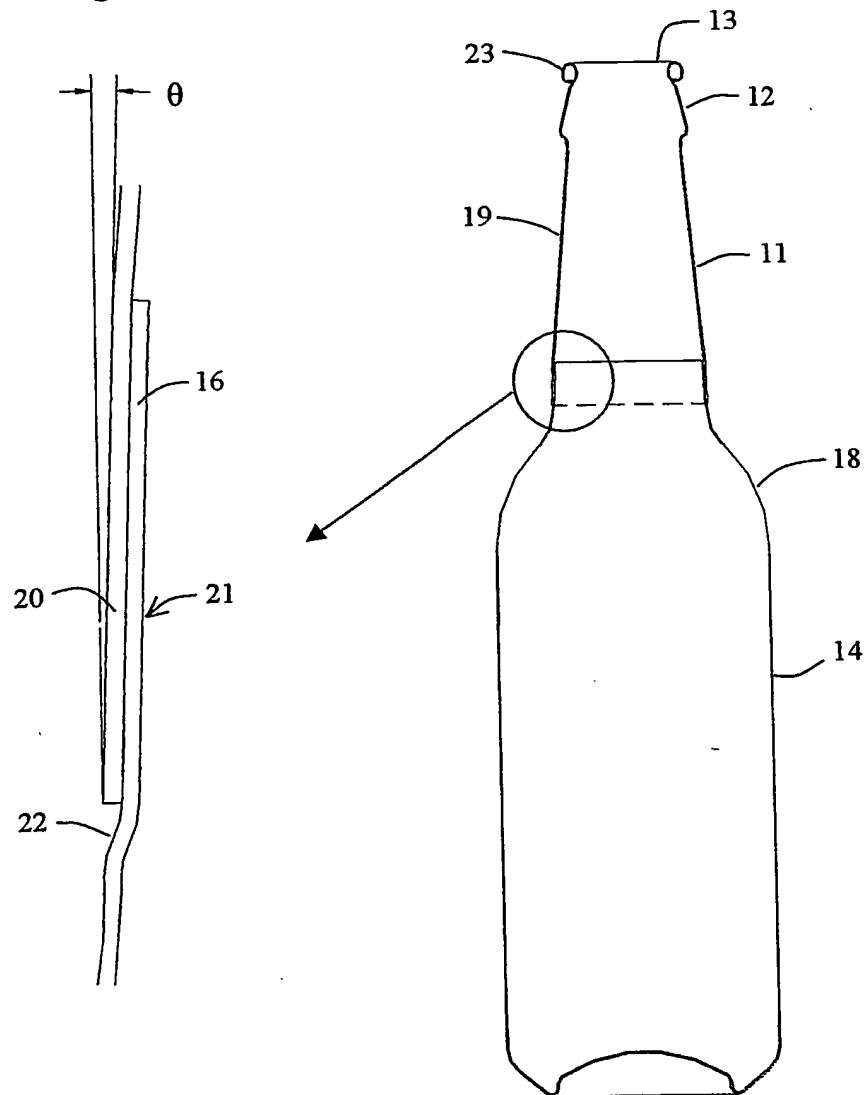


Fig. 1B

Fig. 2

Fig. 2C



4/4

Fig. 2A

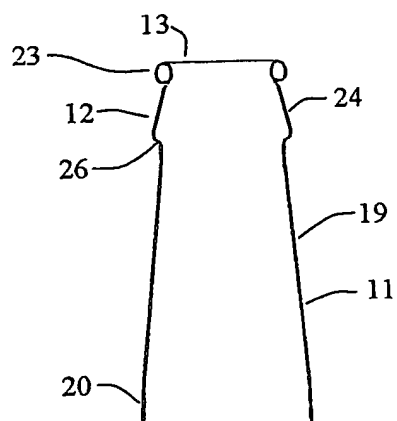
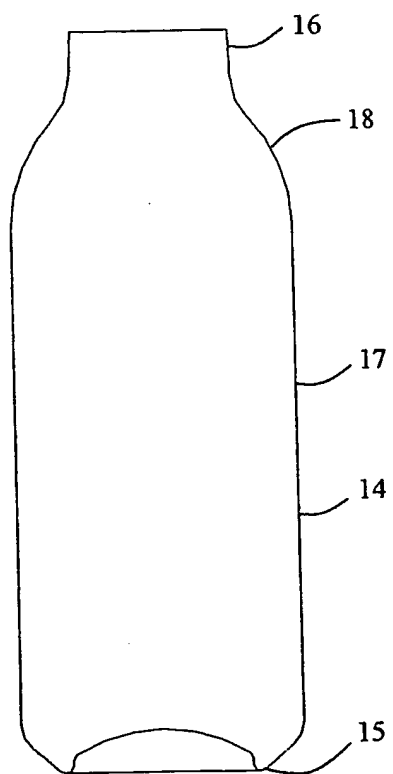


Fig. 2B



(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
11 December 2003 (11.12.2003)

PCT

(10) International Publication Number  
**WO 2003/101845 A3**

(51) International Patent Classification<sup>7</sup>: **B65D 8/22**

(21) International Application Number:  
PCT/CA2003/000809

(22) International Filing Date: 30 May 2003 (30.05.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/385,386 3 June 2002 (03.06.2002) US

(71) Applicant (for all designated States except US): **ALCAN INTERNATIONAL LIMITED** [CA/CA]; 1188 Sherbrooke Street West, Montreal, Québec H3A 3G2 (CA).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GILLEST, Edmund** [US/US]; 80 Wiley Lane, Batavia, IL 60510 (US).

**WILSON, Lloyd** [US/US]; 3107 Anton Drive, Aurora, IL 60504 (US). **GEHO, Jeffrey, Edward** [US/US]; 3023 Fairfield Lane, Aurora, IL 60504 (US).

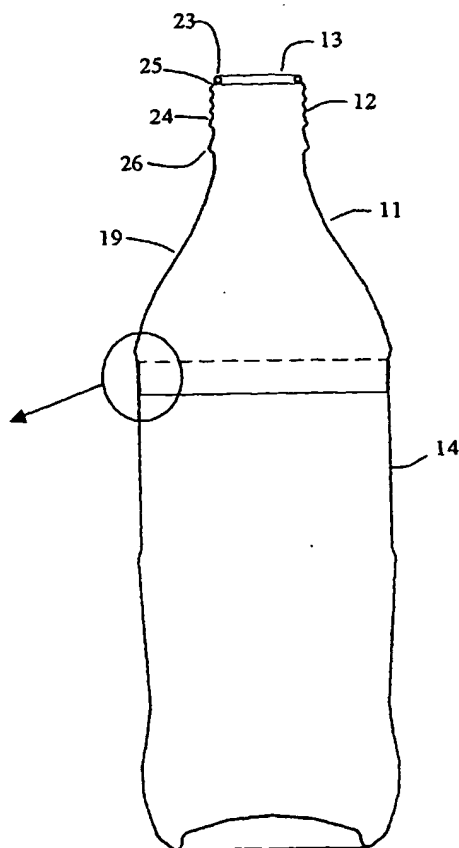
(74) Agents: **GALE, Edwin, J. et al.**; **KIRBY EADES GALE BAKER**, P.O. Box 3432, Station D, Ottawa, Ontario K1P 6N9 (CA).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,

[Continued on next page]

(54) Title: TWO PIECE CONTAINER



(57) Abstract: A two piece container having a hidden peripheral seam is described. The seam between the upper portion (11) and the lower portion (14) of the container is formed of mating flanges (16, 20) on the upper and lower portions (11, 14) of the container and it is effectively hidden from view by placing the seam at the base of the neck in containers having a relatively long slender neck above a relatively larger diameter main body portion or by placing the seam immediately below a relatively larger diameter shoulder near the base of the upper section of the container so that the seam is visually obscured by the shoulder section. Other complimentary decoration and finishing techniques for reducing the visibility of the seam on such a container are also described.

WO 2003/101845 A3





ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:  
22 July 2004

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 B65D8/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 109 986 A (TOYO SEIKAN KAISHA LTD) 13 June 1984 (1984-06-13)	1
Y	page 4, line 4 - page 14, line 8; figures	2-21
Y	US 4 417 667 A (ROTH DONALD J ET AL) 29 November 1983 (1983-11-29) column 5, line 33 - column 7, line 2; figures 1-5	2-21
A	GB 1 453 540 A (AMERICAN CAN CO) 27 October 1976 (1976-10-27) page 3, right-hand column, line 117 - page 4, left-hand column, line 42; figures 1-3	11-17
A	US 1 485 555 A (DAYKIN SPENSLEY S) 4 March 1924 (1924-03-04) the whole document	8
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*G\* document member of the same patent family

Date of the actual completion of the international search

7 June 2004

Date of mailing of the international search report

14/06/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

Olsson, B

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 508 481 A (KOBAYASHI SEISHICHI ET AL) 2 April 1985 (1985-04-02) column 2, line 48 - column 3, line 12; figures 1-3 -----	1-21

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 0109986	A	13-06-1984	EP	0109986 A1	13-06-1984
			DE	3275641 D1	16-04-1987
US 4417667	A	29-11-1983	AT	10728 T	15-12-1984
			AU	542031 B2	31-01-1985
			AU	7568681 A	01-04-1982
			BR	8106173 A	15-06-1982
			CA	1163584 A1	13-03-1984
			DE	3167726 D1	24-01-1985
			DK	425981 A	27-03-1982
			EP	0048890 A1	07-04-1982
			ES	8303228 A1	01-05-1983
			GB	2084107 A ,B	07-04-1982
			GR	75018 A1	12-07-1984
			JP	57086450 A	29-05-1982
			ZA	8106677 A	29-12-1982
GB 1453540	A	27-10-1976	NONE		
US 1485555	A	04-03-1924	NONE		
US 4508481	A	02-04-1985	JP	1389342 C	14-07-1987
			JP	58071974 A	28-04-1983
			JP	61058106 B	10-12-1986
			AU	8948782 A	05-05-1983
			DE	3268865 D1	13-03-1986
			EP	0079136 A1	18-05-1983
			KR	8902599 B1	20-07-1989
			ZA	8207636 A	31-08-1983

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

☒ **BLACK BORDERS**

☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**

☐ **FADED TEXT OR DRAWING**

☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**

☐ **SKEWED/SLANTED IMAGES**

☒ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**

☐ **GRAY SCALE DOCUMENTS**

☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**

☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**

☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**